IN THE CLAIMS:

Claim 1 (Currently amended) A high speed mass storage system which is readily expandable to increase its storage capacity while the system is in operation comprising:

a first server including a first controller and at least one first computer connected in communication with said first controller, each said at least one first computer including at least one CPU;

a second server including a second controller and at least one second computer connected in communication with said second controller, each said at least one second computer including at least one CPU;

first and second mass storage modules each including:

(a) a plurality of plug-in storage devices for storing information;

(b) a storage device bypass circuit board associated with each storage device, each storage device being plugged into a connector on the storage device bypass circuit board, and each of said storage device bypass circuit boards of said first and second mass storage modules including first and second electrical switches, each of said first and second electrical switches including input and output electrical connections to said first and second controllers, respectively, each of said first and second electrical switches including input and output electrical connections to a corresponding one of said plug-in storage devices, and a fault signal output produced by said corresponding one of said plurality of storage devices being connected to each of said first and second electronic

switches to control switching of said first and second electrical switches to alternatively route signals to and from said first and second controllers to and from said corresponding one of said plurality of storage devices, or to bypass said corresponding one of said plurality of storage devices;

(c) a module bypass circuit board including an optical input/output connector for outputting electrical signals from the module as light signals and for inputting light signals into the module as electrical signals, and wherein the optical input/output connectors of the module bypass circuit boards of the first and second mass storage modules are connected by a fiber optic transmission medium such that signals are communicated between the first and second mass storage modules in the form of light;

said first controller providing a communication path between the first server and each said storage device through its associated storage device bypass circuit board and through the module bypass circuit board, said second controller providing a communication path between the second server and each said storage device through its associated storage device bypass circuit board and the module bypass circuit board; and

at least one of said servers being operative to establish direct communication between the first and second controllers, and said first and second controllers being operative to maintain direct communication between the first and second controllers independent of said at least one first computer of said first server and said at least one second computer of said second server.

Claim 2 (Currently amended) The high speed mass storage system of claim 1 wherein each storage device bypass circuit board ~~includes a circuit which~~ completes the

connection of the at least one first computer or the at least one second computer with the other storage device bypass circuits and their associated storage devices whether or not the storage device is present.

Claim 3 (Previously presented) The high speed mass storage system of claim 1 wherein each said module bypass circuit board outputs electrical signals from the corresponding mass storage module via the optical input/output connector when light signals are received by said optical input/output connector.

Claim 4 (Cancelled)

Claim 5 (Previously presented) The high speed mass storage system of claim 1 wherein the module bypass circuit board of the first mass storage module outputs electrical signals from the first mass storage module to the second mass storage module via the optical input/output connector when light signals are received from the second mass storage module by said optical input/output connector.

Claim 6 (Previously presented) The high speed mass storage system of claim 1 wherein each said mass storage module includes a storage device bypass board connector for each of the storage device bypass circuit boards with an opening between each connector to permit the flow of air between the connectors and alongside the bypass circuit boards and storage devices for cooling purposes.

Claim 7 (Previously presented) The high speed mass storage system of claim 1 wherein the storage devices are disk drives and the storage device bypass circuit boards are disk drive bypass circuit boards each having a connector to receive a disk drive.

Claim 8 (Previously presented) The high speed mass storage system of claim 7 wherein each said mass storage module includes a disk drive bypass circuit board connector for each of the drive bypass circuit boards with an opening between each connector to permit the flow of air between the connectors, and wherein each drive bypass circuit board is a relatively flat circuit board with a connector on opposite edges, wherein one of the connectors is the connector which receives the disk drive and the other connector connects to said drive bypass circuit board connector, said connectors, bypass circuit boards and drives being arranged such that when they are connected there is a path for air flow from outside the module alongside each bypass circuit board and its associated disk drive for cooling purposes without any backplane obstruction.

Claim 9 (Previously presented) The high speed mass storage system of claim 8 wherein each said mass storage module is housed in an enclosure and at least one fan is mounted to force air from outside said enclosure through the spaces between said bypass boards and drives.

Claim 10 (Previously presented) The high speed mass storage system of claim 1 wherein the controller operates with a Fibre Channel protocol.

Claim 11 (Previously presented) The high speed mass storage system of claim 1 wherein the controller is an arbitrated dual channel Fibre Channel controller.

Claim 12 (Previously presented) The high speed mass storage system of claim 10 wherein each storage device is a disk drive and wherein each storage device bypass circuit board comprises a disk drive bypass circuit board including a circuit which completes the connection of the at least one first computer or the at least one second

computer with the other drive bypass circuits and their associated disk drives whether or not the disk drive is present.

Claim 13 (Previously presented) The high speed mass storage system of claim 12 wherein the module bypass circuit board outputs electrical signals from each said mass storage module via the optical input/output connector when light signals are received by said optical input/output connector.

Claims 14-15 (Cancelled)

Claim 16 (Previously presented) The high speed mass storage system of claim 11 wherein the storage devices are disk drives and the storage device bypass circuit boards are disk drive bypass circuit boards, and wherein the at least one module includes a disk drive bypass board connector for each of the disk drive bypass circuit boards with an opening between each connector to permit the flow of air between the connectors and alongside the bypass circuit boards and disk drives for cooling purposes.

Claim 17 (Previously presented) The high speed mass storage system of claim 12 wherein each said mass storage module includes a disk drive bypass circuit board connector for each of the disk drive bypass circuit boards with an opening between each connector to permit the flow of air between the connectors, and wherein each disk drive bypass circuit board is a relatively flat circuit board with a connector on opposite edges, wherein one of the connectors is the connector which receives the disk drive and the other connector connects to said disk drive bypass circuit board connector, said connectors, bypass circuit boards and drives being arranged such that when they are connected there is a path for air flow from outside each said mass storage module

alongside each bypass circuit board and its associated disk drive for cooling purposes without any backplane obstruction.

Claim 18 (Previously presented) The high speed mass storage system of claim 17 wherein each said mass storage module is housed in an enclosure and at least one fan is mounted to force air from outside said enclosure through the spaces between said bypass boards and drives.

Claim 19 (Currently amended) A high speed mass storage system adapted to be readily expandable to increase its capacity while the system is in operation comprising:

a first server including a first controller and at least one first computer connected in communication with said first controller, each said at least one first computer including at least one CPU;

a second server including a second controller and at least one second computer connected in communication with said second controller, each said at least one second computer including at least one CPU;

first and second mass storage modules each including:

(a) a plurality of plug-in disk drives for storing information;

(b) a disk drive bypass circuit board associated with each disk drive and including a disk drive connector at one edge thereof and a bypass board connector at another edge thereof, each disk drive being plugged into said disk drive connector on the disk drive bypass circuit board, each of said disk drive bypass circuit boards of said first and second mass storage modules including first and second electrical switches, each of said first and

second electrical switches including input and output electrical connections to said first and second controllers, respectively, each of said first and second electrical switches including input and output electrical connections to a corresponding one of said plug-in disk drives, and a fault signal output produced by said corresponding one of said plurality of disk drives being connected to each of said first and second electronic switches to control switching of said first and second electrical switches to alternatively route signals to and from said first and second controllers to and from said corresponding one of said plurality of storage devices, or to bypass said corresponding one of said plurality of storage devices;

(c) a module bypass circuit board including an optical input/output connector for outputting electrical signals from the module as light signals and for inputting light signals into the module as electrical signals, and wherein the optical input/output connectors of the module bypass circuit boards of the first and second mass storage modules are connected by a fiber optic transmission medium such that signals are communicated between the modules in the form of light, each of said module bypass circuit boards of said first and second mass storage modules including first and second electrical switches, each of said first and second electrical switches including input and output electrical connections to said first and second controllers, respectively, each of said first and second electrical switches including input and output electrical connections to said optical input/output connector, and a signal detect output produced by said optical input/output connector being connected to each of said first and second electronic switches to control switching of said first and second electrical switches to alternatively

route signals to and from said first and second controllers to and from a corresponding one of said first and second mass storage modules, or to bypass said corresponding one of said first and second mass storage modules;

said first controller connecting the at least one first computer of the first controller with each said disk drive through its associated drive bypass circuit board and through the module bypass circuit board such that a loop is formed between the output and input of the first controller with each disk drive bypass circuit board and the module bypass circuit board in said loop and completing said loop whether or not a disk drive is plugged into the disk drive connector; and

said second controller connecting the at least one second computer of the second controller with each said disk drive through its associated drive bypass circuit board and through the module bypass circuit board; and

at least one of said first and second servers being operative to establish direct communication between the first and second controllers, and said first and second controllers being operative to maintain direct communication between the first and second controllers independent of said at least one first computer of said first server and said at least one second computer of said second server.

Claim 20 (Previously presented) The high speed mass storage system of claim 19, wherein said module bypass circuit board of said first mass storage module completes said loop through the second module.

Claim 21 (Previously presented) The high speed mass storage system of claim 19 wherein the module bypass circuit board outputs electrical signals from each said

mass storage module via the optical input/output connector when light signals are received by said optical input/output connector.

Claim 22 (Cancelled)

Claim 23 (Previously presented) The high speed mass storage system of claim 19 wherein the module bypass circuit board of each said mass storage module outputs electrical signals from the first mass storage module to the second mass storage module via the optical input/output connector when light signals are received from the second mass storage module by said optical input/output connector.

Claim 24 (Previously presented) The high speed mass storage system of claim 19 wherein each said mass storage module includes a drive bypass board connector for each of the drive bypass circuit boards with an opening between each connector to permit the flow of air between the connectors and alongside the bypass circuit boards and disk drives for cooling purposes.

Claim 25 (Previously presented) The high speed mass storage system of claim 19 wherein each said mass storage module includes a drive bypass circuit board connector for each of the drive bypass circuit boards, and wherein each drive bypass circuit board is a relatively flat circuit board with a connector on opposite edges, wherein one of the connectors is the connector which receives the disk drive and the other connector connects to said drive bypass circuit board connector, said connectors, bypass circuit boards and drives being arranged such that when they are connected there is a path for air flow from outside each said mass storage module alongside each bypass circuit

board and its associated disk drive for cooling purposes without any backplane obstruction.

Claim 26 (Previously presented) The high speed mass storage system of claim 25 wherein each said mass storage module is housed in an enclosure and at least one fan is mounted to force air from outside said enclosure through the spaces between said bypass boards and drives.

Claim 27 (Previously presented) The high speed mass storage system of claim 26 wherein each drive bypass circuit board connector is mounted in the same plane in spaced relationship with each other.

Claim 28 (Previously presented) The high speed mass storage system of claim 19 wherein the controller operates with a Fibre Channel protocol.

Claim 29 (Previously presented) The high speed mass storage system of claim 19 wherein the controller is an arbitrated dual channel Fibre Channel system.

Claim 30 (Currently amended) The high speed mass storage system of claim 29 wherein each drive bypass circuit board ~~includes a circuit which~~ completes the connection of the at least one first computer or the at least one second computer with the other drive bypass circuits and their associated disk drives whether or not the disk drive is present.

Claim 31 (Previously presented) The high speed mass storage system of claim 29 wherein the module bypass circuit board outputs electrical signals from each said mass storage module via the optical input/output connector when light signals are received by said optical input/output connector.

Claims 32-33 (Cancelled)

Claim 34 (Previously presented) The high speed mass storage system of claim 29 wherein each said mass storage module includes a drive bypass board connector for each of the drive bypass circuit boards with an opening between each connector to permit the flow of air between the connectors and alongside the bypass circuit boards and disk drives for cooling purposes.

Claim 35 (Previously presented) The high speed mass storage system of claim 29 wherein each said mass storage module includes a drive bypass circuit board connector for each of the drive bypass circuit boards with an opening between each connector to permit the flow of air between the connectors, and wherein each drive bypass circuit board is a relatively flat circuit board with a connector on opposite edges, wherein one of the connectors is the connector which receives the disk drive and the other connector connects to said drive bypass circuit board connector, said connectors, bypass circuit boards and drives being arranged such that when they are connected there is a path for air flow from outside each said mass storage module alongside each bypass circuit board and its associated disk drive for cooling purposes without any backplane obstruction.

Claim 36 (Previously presented) The high speed mass storage system of claim 35 wherein each said mass storage module is housed in an enclosure and at least one fan is mounted to force, air from outside said enclosure through the spaces between said bypass boards and drives.

Claim 37 (New) The high speed mass storage system of claim 1 wherein each of said module bypass circuit boards of said first and second mass storage modules include first and second electrical switches, each of said first and second electrical switches including input and output electrical connections to said first and second controllers, each of said first and second electrical switches including input and output electrical connections to said optical input/output connector, and a signal detect output produced by said optical input/output connector being connected to each of said first and second electronic switches to control switching of said first and second electrical switches to alternatively route signals to and from said first and second controllers to and from a corresponding one of said first and second mass storage modules, or to bypass said corresponding one of said first and second mass storage modules.